STONES IN SINGLE KIDNEYS—THEIR MANAGEMENT*

REPORT OF CASES

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IT is with a high degree of confidence and unconcern that we advise and urge the most radical surgical procedures upon a diseased kidney when we know its opposite fellow is normal. On the contrary, when a patient has a single kidney, whether due to a congenital absence, disease, or to the surgical removal of its fellow, any impairment excites as much apprehension as a lesion of the heart, brain, or any other single vital organ. That this apprehension is more or less general, and that single kidneys are attacked only as a last resort, is illustrated by a statement by Keyes in a report on six cases, in which he operated on four of the patients for anuria, and one for persistent pain. All his patients stood the operation as well as patients with two kidneys.

Walters of the Mayo Clinic reports forty-three cases of single kidney and ureter operations with a mortality rate of 14 per cent. The cause of death in all patients was due to sepsis and uremia, and he urged an early operation for removal of stone before renal insufficiency and infection developed to such extent as to greatly increase the operative risk. Keyes stressed three points in his operative technique: first, the kidneys were handled gently; second, the pyelotomy incision was left unsutured; third, the kidneys were decapsulated. These precautions were taken in the hope of minimizing the postoperative renal congestion. There were a few other articles reporting one or two cases of operations on single kidneys, mostly for calculus anuria, or for resection of the solitary double kidney types.

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COMMENT ON REPORT OF CASES

This presentation is based on the report of four cases, three of which were true solitary kidneys, due to nephrectomies of the opposite kidneys, and one case of uremia from bilateral nephrolithiasis, with one completely obstructed and functionless kidney, and the other containing a large stag-horn stone completely filling the pelvis and calyces.

The particular point in the operative technique was gentleness, as stressed by Keyes, but rather, by *not* handling than by handling the kidneys. In order to accomplish this, ribs were removed where necessary, to facilitate the approach to the posterior surface of the kidney, pelvis, and ureter, without stripping the kidney of any more of the perirenal fat than necessary.

In the first case (Fig. 1), the pelvis was of the extrarenal type and the stone small, so that only the lower half of the posterior surface of the kidney, the pelvis and upper end of the ureter were exposed and the stone was easily removed through a simple pyelotomy.

The next case (Fig. 2) presented greater difficulties of approach. A rib was removed, and only the lower pole, lower half of the posterior surface, ureter and pelvis exposed. The pelvis in this case was the intrarenal type. The upper end of the ureter was opened and the incision carried to the renal parenchyma. A small stone was easily removed, but the large one which filled the lower dilated calyx and protruded by a smaller nodule into the pelvis, could not be dislodged. The incision in the pelvis was sufficient to allow the little finger to be pushed against the stone bulging the cortex, where a curved clamp was thrust through the cortex into the calyx and spread gently. The stone, one by two centimeters in size, was grasped by stone forceps and by traction, assisted by the finger in the pelvis, and was removed by a partial nephrolithotomy, which was closed by a single mattress suture with damage to not more than a cubic centimeter of renal tissue.

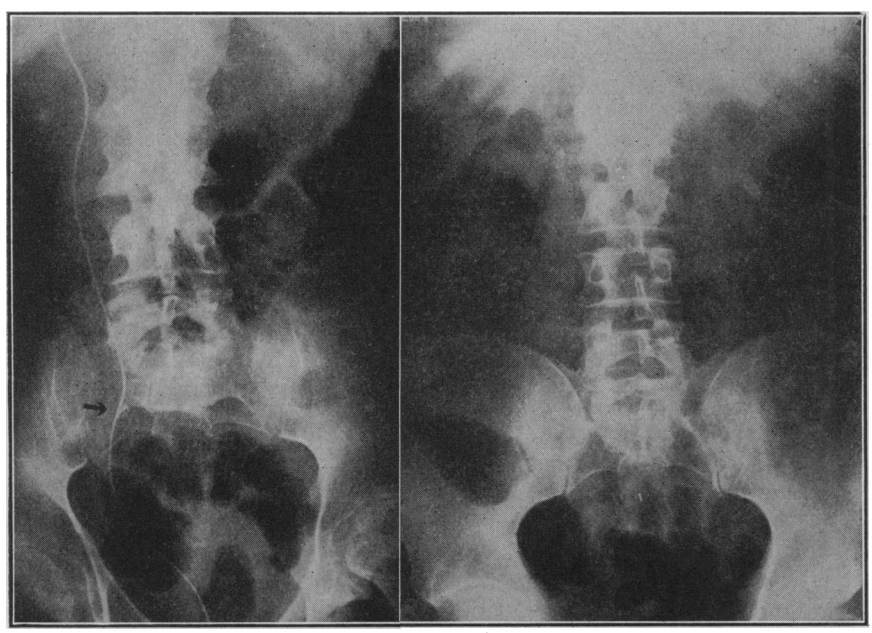

Fig. 1 (Case 1).—Kidney and ureteral stones in solitary kidney and ureter.

Fig. 2 (Case 2).—Stones in solitary right kidney.

The third case (Fig. 3) of single kidney came in with an anuria of over

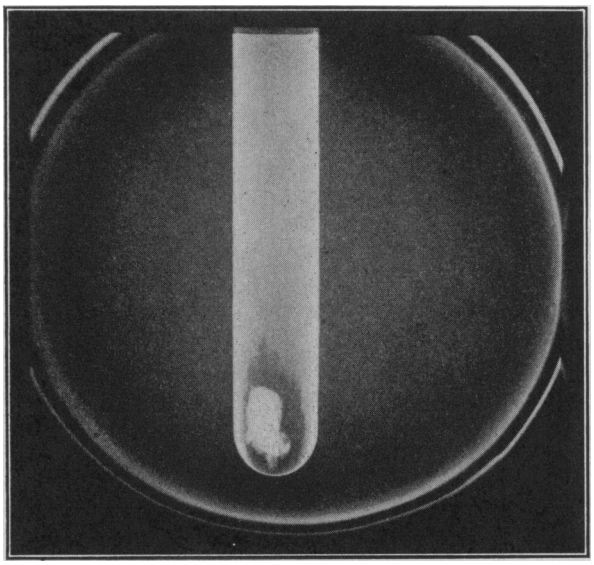

Fig. 3 (Case 3).—Large ureteral stone in tube and beaker of urine, which did not cast an x-ray shadow in patient.

twenty-four hours. The x-ray examination was negative, no stones showing. The ureteral catheter was stopped at about twenty centimeters. Exposure at this point delivered a large ureteral stone, which cast a dense shadow in all media (Fig. 3) and under all conditions after removal.

The fourth case (Fig. 4) came in uremic and septic, with a greatly diminished output of urine, due to bilateral nephrolithiasis mentioned above. His blood urea before operation was 102 milligrams per 100 cubic centimeters. In this case a rib was resected and the kidney, ureter, and large extrarenal pelvis were exposed. The pelvis was incised, and the bridge of stone filling the pelvis between the upper and lower calyces was broken away with clamp and rongeur forceps and removed in pieces. A clamp was held under the ureter at the lower end of the incision to prevent particles from dropping down the ureter toward the bladder. The ends of the stone filling the kidney poles were grasped with forceps, and after a little difficult manipulation were removed (Fig. 6). The pelvis was then thoroughly irrigated with salt solution to remove small particles, and the pelvis palpated (Fig. 5). The blood urea rose to 198 milligrams, postoperative, then slowly diminished to a level of 40 to 50 milligrams, which is still maintained.

Incisions into pelves and ureters were approximated by interrupted fine catgut sutures in all cases, and suitable drainage installed. Fluids were not immediately pressed for fear of increasing congestion, only 500 to 700 cubic centimeters of salt solution daily being given under the skin for the first two days, until a free urine output was established, and then fluids were forced. The recoveries were all fairly uneventful.

REPORT OF CASES

Case 1.—O. M. Hospital No. 182247. Age, twenty-eight; unoccupied; white; male. Six years before coming under observation the patient was in an automobile accident; fractured spine in three places, fractured pelvis, ribs and skull. Patient had laminectomy following injury. He had urinary and fecal incontinence for three to four months following injury. A retention catheter was in place during this time. The urine became very foul. Some gravel was passed following removal of catheter. In 1926 patient had a lithotrity. Two years ago a left perirenal abscess was drained, and two months later the remainder of the left kidney was removed. Patient entered Lane Hospital on November 26, 1928, complaining of pain in the bladder and rectum, incontinence, and paralysis of legs below knees. Urine was very dirty, many red blood cells present; blood urea, 22.5 milligrams. Phthalein 50 per cent, two hours. Cystoscopic examination showed two bladder calculi three by two centimeters and one by two centimeters in size. X-ray showed a right renal calculus in the lower pole of the kidney and a small ureteral calculus three by four millimeters at the brim of the pelvis. Blood normal. On December 5, 1928, lithotrity was attempted, but the calculi were too hard to be crushed, so lithotomy was performed. Postoperative course uneventful. The patient's urinary symptoms were much improved following this. On December 21, 1928, patient was able to hold urine two to three hours, where he had been more or less incontinent before the operation. On December 24, 1928, phthalein was 40 per cent. On January 14, 1929, the ureteral calculus was removed through a right inguinal incision. Postoperative course uneventful. On January 24, 1929, blood urea

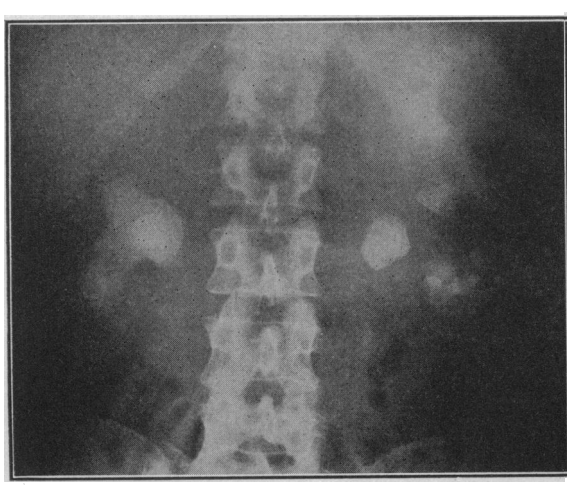

Fig. 4 (Case 4).—Large stag-horn stone removed through pyelotomy incision.

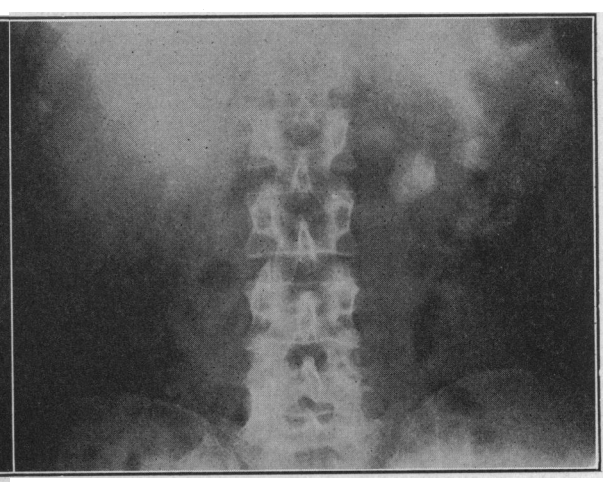

Fig. 5 (Case 4).—Four months after removal of stone from right kidney.

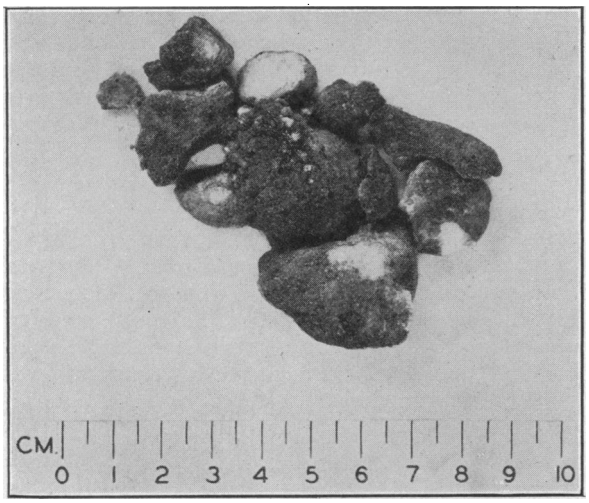

Fig. 6 (Case 4).—Stone after removal.

was 26.25 milligrams. On February 11, 1929, right pyelotomy was performed, a small calculus one by five centimeters was removed from the lower calyx. Patient recovered from this operation uneventfully. Following this a long course of physiotherapeutic measures were started. Patient left the hospital on June 10, 1929, markedly improved.

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Case 2.—W. C. Hospital No. 178983. Age, thirty-eight; white; male. Salesman. Past history: Patient had gonorrhea in 1918. In 1920 a seminal vesiculectomy was performed at a Kansas City hospital which resulted in a recto-urethral fistula that did not heal, although several attempts were made to repair it. The patient enjoyed fairly good health in spite of a chronically infected urinary tract, until April 1928, when a left pyonephrosis developed, and on April 13, 1928, a left nephrectomy was done. During the convalescence a stone was discharged from the wound. There was still some left-sided pain persisting, and the general condition of the patient was not good. He was not able to work at all. An unsuccessful attempt was made to close the recto-urethral fistula in August 1928. X-rays at this time showed two calculi in the lower pole of the right kidney; one measured one by two centimeters, the other very much smaller. The patient was still unable to do any work, and on February 25, 1929, following an automobile ride, he developed severe colicky pain in the right kidney region, radiating to the abdomen; nausea and vomiting. He entered Lane Hospital on February 26, 1929. X-rays showed the stones in the right kidney as before. Urine showed much pus and many red blood cells. White blood cells were 19,100; polymorphonuclears, 77 per cent. Blood urea was 36.75 milligrams per 100 cubic centimeters of blood. Temperature on admission was 40.2 centigrade. The temperature fell gradually, reaching normal limits in five days. Ten days following the onset of attack, March 8, 1929, pyelotomy and partial nephrolithotomy operations were done. After a resection of the twelfth rib, the lower pole of the kidney was exposed and the ureter found and held in a ureteral clamp. An incision was made into the pelvis posteriorly at the ureteropelvic junction, sufficient to admit the little finger. The smaller stone was removed through this incision with the stone forceps. The larger stone could not be extracted through the pelvis; a curved clamp was pushed through the cortex of the kidney into the pelvis and the stone grasped through this incision. Considerable infection delayed the healing of the wound. Temperature was septic for ten days postoperative, but following this it dropped to normal and recovery was complete. On April 12, 1929, successful repair of the recto-urethral fistula was performed. On June 14, 1929, x-ray examination showed no calculus. X-ray was repeated on December 5, 1929, and was negative. Blood urea, 30 milligrams per 100 cubic centimeters of blood.

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Case 3.—G. C. Hospital No. 149283. Greek; male; age, fifty-seven. Gardener. This patient entered the hospital on February 8, 1929, complaining of having had severe pain in right side and back, nausea, vomiting, and anuria for twenty-five hours. He had had a left nephrectomy three years before for pyonephrosis with calculi. One and one-half years following this a suprapubic prostatectomy was done. Examination on admission showed a very sick man. Temperature, 38.3; pulse, 112; rigidity and tenderness in the right kidney region. Cystoscopy showed no bladder urine. Catheters were passed up the right ureter about twenty centimeters, but no urine was obtained. X-ray showed no calculus. Diagnosis of calculus completely obstructing right ureter was made. Operation was performed on February 9, 1929. The lower pole of right kidney was exposed in the usual manner. The ureter was dilated down to a point five centimeters below the ureteropelvic junction. At this point a stone was palpated. The ureter was incised over the stone, and very dirty urine gushed out. The stone was removed and the wound closed with drainage. The patient was in much better condition at the end of the operation than at the beginning. Blood urea at operation was 120; postoperative, it rose to 170 and fell to 30 at time of discharge. The patient ran a septic temperature for two weeks, followed by a low-grade temperature for twenty-one days. Patient was discharged on the thirty-ninth day.

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Case 4.—W. M. Hospital No. 167502. Russian; male; age, fifty-nine. Paperhanger. Patient entered Lane Hospital on October 25, 1929, complaining of having had pain in back for four years. Two years previously the patient was operated on and three hundred small stones were removed from the left kidney. The pain persisted on the right side. The patient was uremic. Blood urea, 102 milligrams; white blood cells, 21,200; polymorphonuclears, 78 per cent; hemoglobin, 70 per cent; red blood cells, 3,960,000. Cystoscopy and intravenous indigo-carmine revealed a functionless left kidney. Accordingly it was decided to operate the right kidney, containing the large stag-horn calculus. The kidney was exposed in the usual manner; resection of the twelfth rib gave excellent exposure. The pelvis, which was extrarenal, was opened and the stone crushed with forceps and removed in pieces. The patient made an uneventful recovery and was discharged on the twentieth day postoperative. The blood urea rose to 198, postoperative, and had fallen to forty-eight on day of discharge and this level is still maintained. The patient continues to pass small stones, but is feeling quite well. Cystoscopy now shows a good functioning kidney on the right; the left is still functionless. He refuses operation on the left side.

CONCLUSIONS

1. There were no more difficulties nor complications encountered in this small series of solitary kidney patients than in those with two kidneys.

2. These patients were just as operable and were better risks before they developed their intense pain, sepsis, anuria, and uremia.

3. The practice of gentle handling of the kidney with as little trauma and perirenal stripping as possible and rib resection for better exposure is a large factor in preventing serious postoperative congestion.

4. Although the fluoroscope was not used in the above patients, we have used it in others and

appreciate its value. It should be used in all cases of pelviotomy or nephrolithotomy, particularly when a stag-horn stone is to be crushed and removed in pieces.

5. Stag-horn stones can be crushed and removed through pelviotomy and partial nephrolithotomy in cases of intrarenal pelves in single kidneys as well as bilateral kidneys, with little or no destruction of kidney tissue.

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DISCUSSION

ROBERT V. DAY, M. D. (1930 Wilshire Boulevard, Los Angeles).—Doctor Dillon has covered the ground so completely and arrived at such sound conclusions that practically nothing else is left to be said, except to stress his terse reminders. Not infrequently we are face to face with a solitary kidney already badly damaged and containing one or more large stones. It has been my fortune, or misfortune, to have had more than a dozen such cases, and they are the source of much anxiety. When the calculus is entirely within the cortex and not producing infection, or is a large stag-horn stone not causing any obstruction, one is tempted to temporize. With a stag-horn stone, it is often wiser, I believe, not to operate if the patient is having no clinical symptoms, either objective or subjective.

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J. C. NEGLEY, M. D. (527 West Seventh Street, Los Angeles).—The résumé of Doctor Dillon's narration of cases, conclusions and summary, would lead one to believe that surgery is the method of choice in calculi of solitary kidneys. He is well supported in such belief, for all three cases with renal calculi were able to leave the hospital and evidenced some improvement. No details are given as to conservative medical and cystoscopic treatment, so we must conclude they were discarded for surgery.

For myself, I would submit the following observations:

1. Each case of solitary kidney containing a calculus or calculi is an individual problem for which there is no standard treatment, surgical or otherwise.

2. Small or medium-sized calculi in a well-drained portion of kidney parenchyma or calyces may be surgically removed with safety and benefit.

3. Calculi of any size, in a poorly drained portion of kidney parenchyma or calyces, if removed surgically have a tendency to recur.

4. Surgical removal of calculi does not always relieve destructive inflammatory processes nor is the patient always relieved of distressing symptoms.

5. The need of surgical intervention is often obviated by absolute rest with foot of bed elevated eight to twelve inches, no pillows, introduction of ureteral catheter with pelvic lavage, urinary antiseptics, fluids to tolerance, blood transfusions, and other supportive measures.

6. Removal of stag-horn or other calculi that have reached a size sufficient to occupy over half of the renal parenchyma must be accompanied by trauma, with destruction of greater or lesser amounts of kidney substance. During removal numerous portions, microscopic or larger, may be left behind to act as a nucleus for recurring calculi.

7. Immediate surgical intervention is necessary in total or nearly total suppression of urine. Any surgical procedure at this time should include entire decapsulation to provide for increase of tension following operation. To do this, kidney must be dissected from its bed and freed of all adhesions. The question of rib resection must rest with the individual surgeon, and if he feels that in no other way can exposure of kidney be accomplished, then that must be done.

RABIES*

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IN the control of rabies in dogs two procedures are considered efficacious. They are (1) restraint and (2) preinfectional antirabic vaccination. *No matter how effective, vaccination alone will never control outbreaks of rabies.* Both methods when used in combination are expensive and require a well planned, rigid and devoted organization which, sooner or later, involves the authorities in numerous unpleasant controversies. Since it is imperative that the stray, ownerless dog and cat be destroyed or held in strictest isolation for at least three to four months, the administration of any antirabic ordinance must operate in a humane and yet ruthless manner. Furthermore, in order to be effective, the undertaking to free a city or county from this dreaded disease must have the whole-hearted and sympathetic support of the people of the community and, in particular, the press.

RESTRAINT MEASURES

1. Under restraint as a preventive procedure against rabies in dogs and cats one usually classifies the following measures:

(*a*) Licensing of the animals.

(*b*) Quarantine by locking up the dogs on the premises of the owner.

(*c*) Leashing and muzzling them when on the street.

(*d*) Impounding in special kennels provided for this purpose, or

(*e*) Destruction of the stray dogs.

It is believed that leashing is an effective method. However, experience has taught that evasions are quite numerous.

Muzzling is an absolute necessity in order to prevent the dogs from biting man and dogs. A metal muzzle of the basket type, properly fitted, will insure complete and humane protection, provided the owners are instructed concerning their use. Isolation on the premises without muzzling is of questionable value and can only be recommended as a temporary expedient in badly infected areas.

Under the present existing condition of the epizoötic, it is doubtful that the methods of restraint applied to a limited area will accomplish a great deal.

Every effort should be made, by mutual agreement between the health and police authorities of the counties, to introduce control measures from

* The rabies situation in Los Angeles County has recently given health officials considerable concern. Humane and antivivisection society representatives took a prominent part in the hearings before the Los Angeles City Council. In a conference with Dr. Karl Meyer on the certified milk situation, the editor asked him if he would present his views on handling a rabies situation to the Los Angeles City Council, if so requested. This article and a letter in the Correspondence column of this number of California and Western Medicine are the responses to that request.

For interesting rabies statistics received from the health departments of Los Angeles County and of Los Angeles City, see letters in the Correspondence column of this issue of California and Western Medicine, page 69.